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RECOVERY OF SPECIFIC MICROORGANISMS FROM URINE AND FECES OF INFECTED ANIMALS

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In conducting the research reported here, the investigators adhered to "Principles of Laboratory Animal Care" as established by the National Society for Medical Research.

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ABSTRACT

Prevention of occupationally acquired laboratory infection among experimenters and animal caretakers is easier when it is known if the microorganisms under study are excreted in the urine and/or feces of the experimental animal. Appropriate precautionary procedures can then be established.

This preliminary report lists 351 references to 56 diseases; human laboratory infections of 43 of the diseases have occurred. The table shows whether the etiologic agent has been recovered, or could not be recovered, from the urine and/or feces of man and various domestic and laboratory animals.

RECOVERY OF SPECIFIC MICROORGANISMS FROM URINE AND FECES OF INFECTED ANIMALS

Microbiological safety measures to reduce occupational infection of laboratory personnel have been receiving increased attention.[1,2,3] A major problem lies in deciding what is important in laboratory design,[4] equipment, and precautionary technique.[5] Inevitably there are inconsistencies. An important reason for such inconsistencies is that the precipitating act, source, or means of infection of personnel is unknown in 80 to 84% of laboratory acquired illness.

Animals inoculated with microorganisms pathogenic for man present an ill-defined hazard to the experimenter and account for part of these unexplained illnesses. In a survey at the U.S. Army Biological Laboratories,[5] 12% of the animal caretakers had been infected compared with 21% of the scientific personnel. A survey[2] of 2,262 laboratory infections showed 221 infections among animal caretakers, janitors, etc. Only a few of these infections can be accounted for by bites, scratches, or accidents during inoculation.

In investigations employing infectious biological materials, any information is valuable when it provides a basis for making a best estimate of the hazards of a specific operation, so that appropriate safeguards can be taken. One basis for making an estimate depends upon knowing whether an infected animal will transmit its disease to a normal cagemate. Some of this information has been summarized[6] and is very useful in deciding whether special equipment is justified, particularly when animals are infected by an aerosol.[6]

Another basis for making an informed estimate depends upon knowing whether the inoculated microorganism, or a somewhat similar one, is excreted in urine or feces. This knowledge is important in determining if the animal facilities are adequate in the case of research on those epidemic diseases of domestic animals for which a veterinary permit from the Department of Agriculture is required. For protection of the experimenter it has special significance among the hemorrhagic arboviruses. In some cases, fecal or urinary excretion of the microorganism may require special caging practices, and special treatment such as steaming or autoclaving animal cages before the animal bedding is removed during cage cleaning.

The present report is the result of a literature survey. Each number in the table in the Appendix identifies a literature citation in the list that follows the table. Results after oral inoculation have been omitted. No critical evaluation has been made of each reference. It is anticipated that anyone interested in a specific disease will make his own evaluation of the reported presence or absence of the microorganism. It is hoped

that active experimenters, in diseases for which no report is listed, will make sufficient examinations incidental to the primary purpose of their experiments so that missing information for significant diseases and animals will be available eventually. We are informed this would be most helpful also in the expanding field of cancer-leukemia virology, as a guide in developing realistic precautions. The authors would appreciate being sent appropriate comments, references, and reprints, inasmuch as the U.S. Army Biological Laboratories intends to issue periodic revisions of the Appendix unless some other agency wishes to do this.

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APPENDIX

This appendix consists of a table, the related literature citations, and an author index to those citations.

TABLE 1. RECOVERY OF SPECIFIC MICROORGANISMS FROM URINE AND FECES OF INFECTED ANIMALS

Etiologic Agent or Disease	Animal	Urine		Feces	
		Recovered	Not Recovered	Recovered	Not Recovered
Adenovirus	Cattle			302[a], 309	
	Chicken			310	
	Dog	309		309	
	Man	248,284,309		280,285,309	
	Monkey			309	
	Mouse	309			309
	Swine			312	
African Swine Fever[b]	Swine	333		333	
Anthrax	Cat			146	
	Cattle			206,316	
	Chicken			146	
	Crow			319	
	Dog			146,320	
	Fox			318	
	Guinea Pig	11,205		11,205	
	Horse			316	
	Jackal			321	
	Man	233,234		233,234,244	
	Monkey			10	
	Mouse	205		205	
	Rat			146	
	Sheep			322	
	Swine			322	
	Vulture			317	
Avian Lymphomatosis	Chicken			297,298	
Botulinum Toxin[b]	Guinea Pig	220			
	Man	219,257			
	Rabbit	247			

a. See Literature Cited page 15.
b. No laboratory in ections are known to the authors.
c. No data found by the authors.

Etiologic Agent or Disease	Animal	Urine		Feces	
		Recovered	Not Recovered	Recovered	Not Recovered
Brucellosis	Cattle	97,186		97,186	
	Chicken			7	
	Dog	24,59,76	147	24	
	Guinea Pig	76,164		164	
	Horse	42,97	189	97,150,189	
	Man	78,96,97, 133,150	95	96,97,150	95
	Rabbit	164			
	Rat	150,188,200			188
	Sheep	34,35,60,97		60,97	23
	Swine	59,77,79		198	
Coccidioidomycosis	Dog	241		241	109
	Man	84,131,211			
	Monkey				250
Coxsackie A	Cattle			287	
	Man			258,260,267, 268,283	
	Monkey			259	
Coxsackie B	Cattle			287	
	Man	261,262,263		258,260,267, 268,283	
Cryptococcosis[b/]	Dog	184			184
	Man		249		249
Dengue	Man		148,327		
Eastern Equine Encephalitis	Chicken			114	
	Crow			182	
	Horse		111		
	Mouse		170	170	
	Pheasant			337	336
	Rabbit			197	
ECHO Virus	Chimpanzee			265	
	Dog			264	
	Man			258,266,267, 268,283	
EDIM Virus[b/]	Mouse	307		307	

Etiologic Agent or Disease	Animal	Urine		Feces	
		Recovered	Not Recovered	Recovered	Not Recovered
EMC Virus[b]	Man			323,341	
	Mouse	179,323		323	
	Rat		178		178
Foot-and-Mouth	Cattle	313,324,325, 341,351	315	325,341	313,315
	Chicken			345	
	Guinea Pig		315		315
	Man			311,338	
	Swine	300	315	300	315
Glanders	Donkey			85	
	Guinea Pig	124			124
	Hamster	124			124
	Horse			85	
	Man			85	
Histoplasmosis	Bat			196	
	Dog	176	177,187	163,176	187
	Man	215		204,215,216	
Infectious Hepatitis	Dog	304			304
	Man	295,308	293,294	274,289,293, 294,295,296	
Japanese B Encephalitis	Man	201,232	133	232	133
Junin	Guinea Pig	195			195
	Man	269			
Leptospirosis	Cat	190,221			
	Cattle	8,9,25,40, 74,115			
	Dog	26,39,43, 53,74,214		53	
	Guinea Pig	38,52,115, 154		52	
	Hamster	5			
	Horse	43,151,155, 157			
	Man	30,51,52,74, 110,156		52	

Etiologic Agent or Disease	Animal	Urine		Feces	
		Recovered	Not Recovered	Recovered	Not Recovered
Leptospirosis	Mouse	6,43,74,101, 152,153			
	Rat	27,31,36, 37,43,74			
	Sheep	43,74			
	Swine	8,43,74			
Louping Ill[c/]					
Lymphocytic Choriomeningitis	Man	68,272,323			
	Monkey	342			
	Mouse	288,323, 341,343		323,341,343	
Machupo	Guinea Pig	286			
	Hamster	193		286	
	Man	194	228		228
	Mouse			286	
	Rabbit	286			
	Vesper Mice	193			
Melioidosis[b/]	Guinea Pig	124,198			124
	Hamster	124			124
	Man	133,166		133	
	Rabbit	198			
	Rat	33		133	
	Sheep	23	125		
	Swine	39			
Monkey B Virus	Monkey		323		323
Mouse Hepatitis[b/]	Mouse			335	
Mumps	Man	274,282,290, 291			
Mycoplasma[b/]	Man	56,58,62		57,62,102	
Newcastle	Cat			253	
	Chicken			167,168,169, 253	
	Dog	253		253	
	Man	253,281			

Etiologic Agent or Disease	Animal	Urine		Feces	
		Recovered	Not Recovered	Recovered	Not Recovered
Plague	Man	129,133,210		129,133,246	
	Rat	133		133	
Poliomyelitis	Chimpanzee			2,19,54,55, 66	
	Man	93		1,14,15,16, 17,18	
	Monkey			41,54,91,92, 94	
Psittacosis	Cattle			144	
	Chicken			61,113,165	
	Dog				143
	Man			68	
	Monkey		71		71
	Parakeet			339	
	Parrot			326,350	
Q Fever	Cat	63	121		
	Cattle	117,119,120, 236,237	22,47,64	119,236	22,47,64
	Chicken			118,255	
	Dog		121		
	Guinea Pig	21,83,112		21	
	Horse		121		
	Man	46,48,122, 222	100,116,149		149
	Mouse	192	21	21	
	Rat	242			
	Sheep	49,236	12,20,121	12,20,45, 49,236	65,72
Rhinovirus[b]	Man				275,276,279
Rift Valley Fever	Cattle		81,104,340		104
	Goat		340		
	Man		81,103,133, 340		
	Mouse		73,340		
	Sheep		81,103		80,340
Rinderpest[b]	Cattle	142,301,303 334		142,301,303	
Rocky Mountain Spotted Fever	Man			328	

Etiologic Agent or Disease	Animal	Urine		Feces	
		Recovered	Not Recovered	Recovered	Not Recovered
Rubella[b/]	Man	271,273,292			
Russian Hemorrhagic Fever	Man	107,158,203			
	Monkey			161	
	Mouse	107,108,159, 160,161,162		108,161,162	
	Rat	107,108,270		108,270	
Russian Spring-Summer Encephalitis	Horse		209		
	Man	208,256	105,106		105
	Mouse	4,69		69	
	Rat	207			
St. Louis Encephalitis	Horse		28		28,67
	Man		28,99		28,229, 230,231
Sarcoma SV-40 Virus[b/]	Baboon	277			
	Monkey	277		278	
Smallpox	Man		132		
	Monkey			254	
Teschen[b/]	Swine		299	299,305,306, 314	
Tsutsugamushi	Man		29,344		
	Mouse		130		
	Rat		130		
Tuberculosis	Cat	238		238	
	Cattle	140,142		134,139,140 142	
	Chicken			140,142,171, 240	
	Dog	119,223,224, 238		199,238	
	Guinea Pig	136,172		135,136,137, 172	
	Man	98,138,141, 174,191,243		138,213,245	
	Monkey	172		225	
	Mouse	172		172,212	
	Rabbit	3,172,181		172,226	
	Rat			217	

Etiologic Agent or Disease	Animal	Urine		Feces	
		Recovered	Not Recovered	Recovered	Not Recovered
Tularemia	Cattle	251		251	
	Guinea Pig			348	
	Man	173			175
	Mouse	235,347		202,235	
	Rabbit	346			
	Sheep	251		251	
	Water Buffalo	349			
Typhus (Endemic)	Cat	128			
	Guinea Pig	126,127,217	192		
	Man		70		
	Mouse		192		
	Rat	50,126,127, 329	227,330		227,330
Typhus (Epidemic)	Guinea Pig		192		
	Man		218		218
	Mouse		192		
Vaccinia	Man	248,252			
Venezuelan Equine Encephalitis	Guinea Pig		145		
	Horse	44	145		44
	Man		13		13
	Monkey[c]				
	Mouse	32	33	32,33	
	Rabbit		145		
Vesicular Stomatitis[c]					
Western Equine Encephalitis	Chicken			75,114	
	Guinea Pig		180,185		180,185
	Horse		28,82		28
	Man		28,99		28
	Monkey				82,185
	Pigeon				183
Yellow Fever	Guinea Pig		87		87
	Man		86,89,90, 331,332		86,89
	Monkey		86,89,90		87,89
	Mouse		87,88		87

a. See Literature Cited page 15.
b. No laboratory infections are known to the authors.
c. No data found by the authors.

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13 ABSTRACT

Prevention of occupationally acquired laboratory infection among experimenters and animal caretakers is easier when it is known if the microorganisms under study are excreted in the urine and/or feces of the experimental animal. Appropriate precautionary procedures can then be established.

This preliminary report lists 351 references to 56 diseases; human laboratory infections of 43 of the diseases have occurred. The table shows whether the etiologic agent has been recovered, or could not be recovered, from the urine and/or feces of man and various domestic and laboratory animals.

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